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Spirometric Studies in Pulmonary Tuberculosis.—Studies of the vital capacity afford material aid in diagnosis and prognosis of pulmonary tuberculosis. The normal values fluctuate somewhat, but they are fairly constant for a given individual between eighteen and forty-five years old. The normal value is obtained by multiplying the height in centimetres of the individual by 25 in males, and 20 in females. Only deviations of more than 10 per cent have practical significance. A decrease in the vital capacity indicates an impairment of the respiratory function which may be caused by pathological alterations in the thoracic wall, pleura, pulmonary circulation, or pulmonary parenchyma. If pulmonary tuberculosis has been recognized as the cause for a diminished vital capacity, it must be considered that the various tissue alterations, such as exudation, specific changes, fibrosis, etc., play a quantitatively different part in bringing about this diminution. In apparently early lesions it is found that so called early infiltrations cause usually a decrease of 500 to 600 cc. while small apical foci and indurative changes depress the vital capacity but little. A marked decrease, even in the absence of marked signs and symptoms, should suggest a lesion of real consequence, while a normal vital capacity permits one to exclude with certainty the presence of an exudative focus. A mere bronchitis does not diminish the vital capacity appreciably. In chronic indurative tuberculosis, the vital capacity is but little depressed as long as no exudative foci coexist. In chronic cases, the fluctuations of the vital capacity in serial observations are caused by the progression and retrogression of the circumfocal infiltrations; this fact has been established by serial roentgenograms. In collapse therapy, spirometric measurements furnish data on the functional status of the lung which cannot be obtained by any other method.—*Ueber den praktischen Wert spirometrischer Untersuchungen bei Lungentuberkulose, H. Kutschera-Aichbergen, Wien. klin. Wchnschr., September 11, 1930, xliii, 1133.*—(*M. P.*)

Respiratory Reserve.—This study deals with the effects produced on the respiratory reserve by lessened mechanical efficiency. The muscles ordinarily responsible for respiratory movements in the dog were rendered functionless in whole or in part by evulsion of their motor nerve trunks. All of the several functions of the diaphragm have been interfered with, so that the diaphragmatic mechanism was reduced to that characteristic of birds. Vital capacity has

been lessened, but never beyond the point where it failed to be equivalent to tidal air. The ventilation in litres of air breathed each minute reached a high normal amount, but was not distinctly abnormal at any time. The haemoglobin decreased from high to low normal percentages, but the amount of haemoglobin for each hundred cubic centimetres of blood was within normal limits. The haematocrit percentages varied slightly, but were never abnormal. The arterial and the venous oxygen content of the blood were essentially normal. However, oxygen saturation of both arterial and venous blood was lowered. The number of erythrocytes failed to indicate either temporary or permanent erythrocytosis such as might have been anticipated had respiratory competence been destroyed. The heart has remained normal functionally, has not shown evidence of hypertrophy, and the electrocardiogram cannot be interpreted to indicate any definite failure of the right ventricle. The experiment illustrates the degree to which muscular dysfunction may be carried before respiratory incompetence develops in an animal which has a normal heart and normal lungs. It seems to confirm the independence of two fundamental functions having interrelated duties; great loss of reserve in one is required before demonstrable evidence of coöperative support is provided by the other.—*The Effect of Lessened Respiratory Reserve on the Blood and on the Circulation, W. S. Lemon, Arch. Int. Med., January, 1930, xlv, 115.—(W. I. W.)*

Water Metabolism in Pulmonary Tuberculosis.—The wheal produced by the intracutaneous injection of 0.1 cc. of physiological salt solution disappears completely in 30 to 40 minutes in normal individuals. This time is increased to 70 to 100 minutes in patients with decompensated cardiac disease. It is concluded that the resorption of intracutaneously injected fluid is delayed in the presence of an increased amount of water in the tissues. This intracutaneous injection is supposed to afford an index of the hydration of the body. It was found that all patients with pulmonary tuberculosis had a considerably increased resorption time. The increased hydration in these patients is probably caused by the overactive protein metabolism, since proteolysis liberates water; this is probably the cause of the phthisical night-sweats. The resorption time decreased in patients simultaneously with clinical improvement.—*Untersuchungen über den Wasserhaushalt bei Lungentuberkulösen, H. Stein, Wien. klin. Wchnschr., September 4, 1930, xliii, 1118.—(M. P.)*

Carbohydrate Metabolism in Pulmonary Tuberculosis.—Some authors believe that in the cachectic forms of tuberculosis with high fever there is a distinct hyperglycaemia and patients in good general condition show a normal glycaemia. In this study the authors found that the sugar-tolerance curve was normal in the slowly progressing fibrotic forms. The advanced and ulcerative forms of the disease showed three types of curves. The first consists of a normal rise and a delayed return to normal. In the second type the curve rises above the normal limit and shows a normal descent. The third type is characterized by a second rise in the sugar curve after its return to normal. This second rise does not return to its former lower level. The alterations of the sugar tolerance curve depend upon fever, amount of tissue destruction, asphyxia, disturbed equilibrium of the endocrine-vegetative system and an insufficiency of the glycolytic and glycogenetic functions of the liver.—*Sul metabolismo degli idrati di carbonio nella tubercolosi polmonari, F. Siero and S. Russo, Tubercolosi, xxi, July, 1929, 284.—(U. E. Z.)*

Lipolytic Power of Blood-Serum in Tuberculosis.—The lipolytic power of the blood-serum in individuals suffering from pulmonary tuberculosis varies according to the general condition of the patient. It is normal or slightly above normal in those whose general physical condition is good. It is markedly diminished in the cachectic stage. Injections of olive oil, ethylmorrhuine, and lecithin increase the lipase content of the blood and augment the defensive powers of the blood against the lipoid constituents of the tubercle bacillus.—*Il potere lipolitico del siero sanguigno nei tubercolosi polmonari, F. Ricci. Tubercolosi, xxi, May, 1929, 193.—(U. E. Z.)*

Hydrogen-Ion Concentration of Blood in Tuberculous Rabbits.—A determination of the hydrogen-ion concentration of the blood in nontuberculous and tuberculous rabbits revealed that the tuberculous disease in the rabbits, even in the most severe form, did not necessarily alter the blood reaction as compared to normal.—*Die Wasserstoffionenkonzentration im Blute tuberkulöser Kaninchen, H. Zain, Zeitschr. f. Tuberk., 1929, liii, 215.—(H. J. C.)*

Liver-Function Tests in Tuberculosis.—The authors examined 25 patients with various forms of tuberculosis to determine the liver function. In 15 cases the bilirubin metabolism was determined in the serum and in the duodenal secretion. Mild afebrile

forms revealed normal serum and bile values. Diminished serum values were found in severe cases, especially those complicated with intestinal tuberculosis. The protein metabolism, using the Widal haemoclastic-crisis test, was determined in 15 cases. Mild uncomplicated atoxic forms of tuberculosis did not change the protein-decomposition ability of the liver. Positive findings occurred in predominantly toxic cases with severe anatomical changes as well as in a case of afebrile tuberculous peritonitis and one of granulomatosis. The carbohydrate metabolism was also tested, using levulose, when 13 cases were examined. In hilum processes the reaction was negative or only slightly positive. In afebrile, cirrhotic processes, even those of decided nature, the test was negative. Markedly positive reactions occurred consistently in severe febrile processes associated with intestinal tuberculosis. The excretion of methylene-blue in the duodenum was likewise tested. The test was negative in enteric processes and severe febrile cases with tissue disintegration, but positive in afebrile cases. This test is considered of no value because it does not correlate with the clinical findings or the other tests. The reaction, however, is believed to coincide with the morphological changes but not, however, with the tuberculous intoxication of the liver parenchyma. As a result of their investigation the authors believe that the protein destruction is effected first in lesions of the liver parenchyma while the carbohydrate metabolism and excretion of bile are least influenced.—*Leberfunktionsprüfung bei Tuberkulose, Irene Barat and R. Wagner, Beitr. z. Klin. d. Tuberk., 1929, lxxi, 597.—(H. J. C.)*

Tuberculosis in Relation to Vegetative Nervous System.—The relation between the vegetative nervous system, basal metabolism and temperature was studied in tuberculosis. In so called "vegetative" cases of tuberculosis, classed as the generalization stage with favorable biological allergy of stage II according to Ranke, there is an increased basal metabolism when there also exists an increase in temperature, which is not the cause of the increase of basal metabolism but is viewed as a coincidental symptom.—*Tuberkuloseformen in ihren Beziehungen zum vegetativen Nervensystem, betrachtet nach Grundumsatz, Temperatur und klinischen Verlauf, A. Deisz, Beitr. z. Klin. d. Tuberk., 1929, lxxi, 587.—(H. J. C.)*

Bacillaemia in Pulmonary Tuberculosis.—The question of bacillaemia in the tuberculous has long been mooted. The classical conception has been that its occurrence was rare and practically limited to miliary involvement. Today, thanks to the recent discoveries of atypical forms of tuberculosis in the guinea pig, characterized by swelling of the lymphatic system and especially the tracheobronchial lymph nodes, without caseous lesions, the situation is upset and it is necessary to search smears from these crushed hypertrophic glands for acid-fast bacilli. Thus, Boncin and Janesco, by inoculating guinea pigs with unfiltered blood from patients with acute disease, have demonstrated an almost constant bacillaemia, and Debré and Bonnet have proved the tuberculous nature of a febrile attack in a child by finding bacilli in the tracheobronchial lymph nodes of a guinea pig inoculated with the child's blood. For eighteen months Bernard and coworkers have pursued similar studies in patients with chronic pulmonary tuberculosis. Samples of blood were taken from 36 patients and each inoculated into two guinea pigs previously negative to the intracutaneous tuberculin test. Each animal received 5 cc. in the abdominal wall. All were killed at six to eight weeks, having shown no local lesions or enlarged superficial lymph nodes. Of the 70 animals necropsied, 25 were entirely normal, but 45 showed more or less lymph-node changes, most often an enlarged tracheobronchial node, sometimes the inguinal, more rarely the mesenteric; there was never any caseation. Three positive smears were obtained from crushing and staining these lymph nodes. Two of the patients were slightly febrile, the third had normal temperature, an ulcerocaseous unilateral involvement treated by phrenicectomy. *Conclusions:* In a little less than 10 per cent (3 out of 36) of patients with chronic pulmonary tuberculosis a bacillaemia was demonstrated by guinea-pig inoculation. In performing necropsy on the inoculated guinea pigs it is necessary to search the lymphatic system particularly and carefully. The not infrequent occurrence of tuberculous bacillaemia sheds new light on the problem of human tuberculous infection.—*Application de la recherche des élements bacillaires sans lésions caséeuses à la question de la bacillémie des tuberculeux, L. Bernard, Desbusquois, and Thoyer, Section d'études scientifiques de l'Oeuvre de la Tuberculose, May 11, 1929, reported in Rev. d. l. Tuberc., August, 1929.—(A. P.)*

Isolation of Tubercle Bacilli from Blood-Stream.—The frequency with which tubercle bacilli occur in the blood-stream is still an open question because all methods for their demonstration are inadequate. The following method is recommended: The

culture medium is an egg medium in which peptone has been replaced by asparagin. Ten cubic centimetres of blood are mixed with 5 cc. of a 5 per cent sodium-citrate solution; the mixture is centrifugated, and the plasma is discarded. The red cells are laked with 3 per cent acetic acid and centrifugated again. One part of the sediment is seeded directly on the media, another part is first subjected to a brief treatment with 15 per cent sulphuric acid. In all cases of miliary tuberculosis and tuberculous meningitis, tubercle bacilli were demonstrated in the blood by this method. In pulmonary tuberculosis, isolation was successful only in far-advanced cases. Out of 8 afebrile patients with extrapulmonary tuberculosis the blood-culture was positive in six. The clinical significance of these findings deserves further investigation.— *Ueber Reinzüchtung von Tuberkelbazillen aus dem Blute, E. Loewenstein and Russeff, Wien. klin. Wchnschr., March 6, 1930, xliii, 295.*—(*M. P.*)

Cultivation of Tubercle Bacillus.— The author tested various culture media for tubercle bacilli, especially to determine whether glycerine-meat-peptone-broth or other synthetic media were best suited for this purpose. On 100 cc. of broth there were obtained 320 mgm. of dry substance of tubercle bacilli after 6 weeks' growth; on Sauton's medium, 1,075 mgm.; and on Long's medium 1,350 mgm. A substitution of peptone for asparagin as a source of nitrogen in Sauton's medium gave 655 instead of 1,075 mgm. A new synthetic medium, containing ammonium oxalate as a source of nitrogen gave 1,830 mgm., which was five to six times that obtained with ordinary broth. Potassium, magnesium, sulphate and phosphate proved to be obligatory ions. For the assimilation of the magnesium there are essential the anions of polyvalent organic acids. Calcium, barium and chlorine are unessential as nutrients for the tubercle bacillus. The best source of carbon is glycerine, while carbohydrates are of less value. The optimal hydrogen-ion concentration is pH 7.5. Oleic acid inhibits the growth of tubercle bacilli. A determination of the critical limits of surface tension revealed that below 0.700 growth was discontinued.— *Zur Biochemie des Wachstums und der Ernährung der Tuberkelbacillen, L. Model, Beitr. z. Klin. d. Tuberk., 1929, lxxi, 685.*— (*H. J. C.*)

Dissociation of Acid-Fast Bacilli.— The term "dissociation," as employed at present, is not adequate to explain the instability and subsequent variation which occur in cultures of acid-fast organisms. But for uniformity of bacterial nomenclature the term has been adopted until a better one is coined. In describing the "R" and "S" colonies, a departure is made from the general usage of these terms, when "R" designates rough, and "S" smooth. It seems better to employ the letter "R" to indicate greater resistance to environment and relative avirulence, and "S" to indicate colonies which are more sensitive to environment while possessing for certain species relatively great virulence. The terms "rough" and "smooth" apply directly only to avian tubercle bacilli when cultivated on plain gentian-violet-egg medium. For dissociating tubercle bacilli gentian-violet-glycerol-egg medium in petri dishes is used. This medium must be properly inspissated, and special rubber bands are slipped around the edge of the plates to prevent contamination and drying. The suspension of bacilli for plating should be made from young bacilli preferably from a fluid medium. Before use, the suspension is filtered through paper and the filtrate is diluted 5 to 10 times for the human tubercle bacillus, while the bovine and avian require 10 to 20 times dilution. From 4 to 6 drops of the filtrate are then inoculated on the surface of 5 or 10 plates made as described. The technique is fully described in the text and must be strictly adhered to to avoid failure. Growth may not appear until the third week. The best time to study the colonies is after six to eight weeks when they have partially matured. A bovine culture (B1) was successfully dissociated. Two types of colonies were obtained, one with a smooth surface and resembling a moth-ball, and a second, large, spreading and wrinkled. These two principal colonies were difficult to separate at times, for very often colonies appeared on the plates differing from these. The addition of 0.25 per cent sodium taurocholate to the medium resulted in colonies which could be differentiated without any difficulty. The "S" (moth-ball) colony produced generalized tuberculosis when inoculated into guinea pigs. Organisms from the "R" colony produced a localized and nonprogressive disease. The foregoing observations were of brief duration (four months). The results might have been different if the animals inoculated with the "R" colony had been allowed to live longer because of a possible reversion of the bacilli in the animal to the "S" type. Lacking suitable media, the human tubercle bacillus H37 has been more difficult to dissociate. Two types of colonies have been obtained, but animal experiments have not been completed. Two extreme types of colonies have been dissociated from 4 *BCG* cultures obtained

from various sources. Each of these four cultures has revealed the same types of colonies. The underlying factors favoring dissociation are not yet clearly understood. It is believed that every single bacillus contains the two components "R" and "S". If the environment is favorable for the development of the "R" component, the offspring will be "R's", although the original organism may be "S". Conversely, if the environment is favorable for the "S" and not for the "R" component the "S" will develop. Nine plates, each with a brief explanatory paragraph, accompany the article.—*Biological Studies of the Tubercle Bacillus, I. Instability of the Organism-Microbic Dissociation, S. A. Petroff and W. Steenken, Jr., J. Exper. Med., June 1, 1930, li, 831.—(J. S. W.)*

Resistance of Tubercle Bacilli to Heat.—A heavy suspension of tubercle bacilli was kept at 70° C. for 30 minutes, and then twice for 30 minutes in boiling water, after which guinea pigs were inoculated and one of six developed enlarged local lymph nodes after 10 weeks. Microscopically there were no tubercle bacilli found but the passage of these lymph nodes to new guinea pigs resulted in a generalized tuberculosis after 8 months. Noteworthy was the slow progressiveness of the tuberculous process in the latter animals and subsequent passages did not alter this, the virulence of the original strain in no case being again attained.—*Über die Widerstandsfähigkeit von Tuberkelbacillen gegen die Einwirkung äusserer Schädigungen, R. Bieling, Zeitschr. f. Tuberk., 1929, liii, 512.—(H. J. C.)*

Action of Bactericidal Substances on Tubercle Bacilli.—The author tested the bactericidal value of a large number of substances upon pure cultures of tubercle bacilli. These substances included alcohol, ether, aldehyde, ketones, phenols, halogens and oxidizing substances. The lipoid solvents were found to be most active, but not all lipoid-solvent antiseptics were active toward tubercle bacilli. The basis of the bactericidal action of these substances still remains uncertain. Especially active were chloroform, propyl and butyl-alcohol, the aldehyde onanthol of the aliphatic series, the phenol chlorthymol and methylhexalin, the benzyl and cinnamic alcohol and salicylic and cinnamic aldehyde of the aromatic series.—*Die Einwirkung keimtötender Stoffe auf Tuberkelbacillen des Typus humanus und bovinus. I. Mitt., E. Hailer, Zeitschr. f. Hyg., 1929, cx, 22.—(H. J. C.)*

Carbohydrates Produced by Tubercle Bacilli.—A polysaccharide may be easily derived in tuberculin from media that was prepared sugar-free. It is precipitated by ten volumes of acetone or alcohol. It is usually associated with protein. Two sugars have been isolated from this product, namely, arabinose and mannose. Cultures of bovine and of human tubercle bacilli develop these products, and avian cultures likewise but in much smaller amounts. Other sugars may also be formed by the tubercle bacillus.—*Carbohydrates Produced by Tubercle Bacilli, M. Dorset and R. R. Henley, J. Am. Veterin. Med. Ass., May, 1930, lxxvi (n. s. xxix), 696.—(H. S. W.)*

Acid-Fast Bacilli in Mixed Cultures.—In cultures mixed with *Saccharomyces albicans* there occurs an increase in non-acid-fast forms of the timothy bacillus while with *B. mesentericus* and *Sarcina tetragenous* this does not occur. On the other hand the mycelia of the *Saccharomyces albicans* degenerate under the influence of the timothy bacillus, and liberate granular and rod-like formations which, when acid-fast, can be confused with the timothy forms. The investigations demonstrate the caution necessary in studying the problem of the polymorphism of acid-fast bacteria.—*Das Verhalten säurefester Bacillen in Mischkulturen mit Saccharomyces albicans, Bac. mesentericus und Sarcina tetragens, M. Schachsuwarly and A. Woldrich, Centralbl. f. Bakt., I. Orig., 1929, cxiii, 93.—(H. J. C.)*

Resistance of Skin to Tubercle Bacilli.—Various strains of tubercle bacilli were rubbed into the skin, and it was found that small doses, which were effective by subcutaneous and intraperitoneal as well as other modes of injection, produced no changes in the skin. Only relatively large amounts were able, after skin inunction, to produce reaction in the form of varying-sized nodules. The bacilli could pass through the skin and produce tuberculous changes in the deeper less resistant organs.—*Über die Widerstandsfähigkeit der Haut gegen die Tuberkelbacillen im Experiment, O. N. Podwyssotzkaja and M. A. Linnikowa, Zeitschr. f. Tuberk., 1929, lii, 474.—(H. J. C.)*

Infectious Processes and Immunity Response.—It is now recognized that the presence of a tuberculous infection makes possible in guinea pigs the development of a skin sensitiveness corresponding in all characteristics to the tuberculin skin sensitiveness following treatment with various antigens (egg white, horse serum, timothy

pollen, etc.). Furthermore, the best results are obtained, both for the development of skin sensitiveness and for the production of antibodies, by injecting the antigen directly into a local focus of infection. The effect of intravenous or subcutaneous injection is usually considerably less. The increased effect of the injection into the lesion is not the result of the irritation of the lesion by the injection. The response of the organism is not a local process, the antigen leaves the lesion and the antibodies are produced elsewhere. It is supposed that the lesion possesses a certain mechanism through which the effect of an antigen is increased when it is resorbed from the lesion and by which it is made to produce a special form of sensitization, which is characteristic of the tuberculous infection. It has not been possible to transfer this form of sensitization passively. In the present paper are reported observations concerning important properties of the lesions, with the help of which the production of the tuberculin-type sensitiveness is successful. Twenty-four hours after the injection of a large dose of the R1 strain of tubercle bacilli into the guinea pig's testicle, the introduction of egg-white in the same place produced tuberculin-type sensitiveness. When intraperitoneal injections were used, forty-eight-hour intervals were necessary between the two injections. In the production of the sensitiveness the local reaction at the site of the tubercle-bacillus injection played the preponderant rôle because only the injection of egg-white in this place was effective. The intravenous injection of small doses was without effect. At the stage when the injections were done, an acute inflammatory reaction was present, the typical tissue reaction of tuberculosis not yet having developed. Evidently the latter is not a prerequisite for the development of the tuberculin type of sensitiveness. It was found possible to produce this type of sensitiveness with the injection of egg-white into the testicle of guinea pigs infected in the same place with smallpox vaccine. Injections of egg-white with extensive acute inflammatory processes produced with such nonbacterial substance as infusorial earth, tapioca, turpentine, etc., were without effect. Injections of processes produced with the soluble substance (lipoids) of the tubercle bacillus were also ineffective. It is improbable that the substances of the bacterium are directly responsible for the influence exerted by the lesions on the immunity response. At present we know only very imperfectly the response of the organism to disease, and it is probable that the method of introducing antigen into the lesion will help us to recognize some new factors in the response.—*Certain Characteristics of the Infectious Processes in Connection with the Influence Exerted on the Immunity Response, L. Dienes and E. W. Schoenheit, J. Immunol., July, 1930, xix, 41.*—(*J. S. W.*)

Experimental Immunization with Dead Tubercle Bacilli.—Marfan pointed out that subjects with lupus or scrofula are refractory toward pulmonary tuberculosis, and numerous authors have insisted that the same holds true of surgical tuberculosis. However, roentgenographic examination of the chests of patients with surgical tuberculosis frequently shows cicatrices, calcifications and other evidence of previous pulmonary infection. It occurred to Coulaud that local resistance, developed in the lung, might account for extrapulmonary localizations and he has carried out experiments on rabbits for over four years. In order to induce a pulmonary tuberculosis tending toward cure he used human or bovine bacilli killed by heat (an hour and a half in the autoclave) and emulsified in 2 cc. of sterilized olive oil. The dose was either 0.5 or 1 cgm. The use of oil makes sure that they will be deposited in the pulmonary capillaries The use of dead bacilli determines lesions of bilateral tuberculous pneumonia which cure completely in two months. If the bacilli are too concentrated or over 1 cgm. in amount there is produced a caseous basal pneumonia, with formation of giant cavities 3 or 4 cm. in diameter with thin emphysematous walls traversed by large vessels likely to ulcerate. In such cases one may find the animal dead in its cage, its nose and lips covered with blood, and one of the cavities will be filled with a clot. When the dose of killed bacilli does not surpass 1 cgm. and when this is well emulsified in oil and injected into the vein through a fine needle, slowly, if there is no intercurrent infection, the rabbits, after an initial drop in weight, pick up slowly. At the end of a month or two they are in good condition, the lungs show no induration, and all tuberculous lesions have disappeared. They have passed through a tuberculous pneumonia which has left no trace. *Experiments: 1:* Twenty adult rabbits were divided in three lots. April 10, 1925, the first lot, of 8, received intravenously 1 cgm. of killed bacilli (Vallée bovine stock) emulsified in 2 cc. of oil. A second lot, of 6, received the same quantity subcutaneously, while a third lot, of 6, was used as controls. Two months later, June 10, 1925, all three lots were tested and then received intravenously 0.1 mgm. of the Vallée bovine culture. The 6 controls lived an average of 119 days and all died of generalized tuberculosis with pulmonary and renal

lesions predominant. The 6 that received subcutaneous injection of the bacilli before virulent injection were clearly resistant, their average survival being 204 days. They all showed confluent pulmonary and renal lesions. Of the first lot, 4 died of tuberculosis between 170 and 240 days; the other 4, killed between 350 and 450 days, showed no tuberculous lesions. Thus, the lungs of 50 per cent previously "vaccinated" showed a resistance to subsequent tuberculous invasion which persisted up to 450 days after such "vaccination." *2:* Two lots of 14 animals were used. The first lot, of 8, had received intravenously, January 30, 1928, 0.5 cgm. of heat-killed bacilli (A-Y stock) emulsified in 1 cc. of sterilized olive oil. March 26, 1928, these animals, together with the second lot of 6, received subcutaneously 0.6 mgm. of bovine culture (Vallée). The controls survived an average of 83 days, and all showed extensive pulmonary and renal lesions. Only 1 of the vaccinated animals, killed after 350 days, showed tuberculous lesions. *3:* March 10, 1926, 10 animals were "vaccinated" with 1 cgm. of Vallée bovine culture, heat-killed and emulsified in 2 cc. oil. Eight animals survived, and these, with 17 controls, received intravenously, May 15, 1926, 0.02 mgm. of A-Y stock. The controls survived an average of 277 days. The "vaccinated" animals, except two that died of intercurrent disease, were killed in apparent health. They showed visceral tuberculous lesions but intact lungs. *Conclusions: 1:* The production of a curable tuberculous pneumonia in a guinea pig determines a certain degree of pulmonary immunity to virulent infection. *2:* This immunity is selective, for while there is some general immunity conferred this flags and the tuberculous process develops in other viscera. *3:* These findings have an analogy in the so called law of Marfan, observed in man.—*Vaccination locale du poumon à l'égard de l'infection tuberculeuse. Les rapports avec la loi de Marfan, E. Coulaud, Section d'études scientifiques de l'Oeuvre de la Tuberculose, May 11, 1929, reported in Rev. d. l. Tuberc., August, 1929, x, 540.*—(*A. P.*)

Artificial Immunization against Tuberculosis.—After reviewing the various methods of protective vaccination the author outlines the principle of producing immunity by the use of virulent "artificial primary focus" material. His plan is to implant intracutaneously a tuberculous focus in a capsule impermeable for tubercle bacilli. Animal experiments will prove whether there is any hazard connected with this procedure and whether it will suffice to produce a specific immunity and tuberculin hypersensitiveness.—*Experimentelle Beiträge zur künstlichen Immunisierung gegen Tuberkulose, I. Mitt. Theoretische Grundlagen, P. Kallos, Beitr. z. Klin. d. Tuberk., 1929, lxxi, 604.*—(*H. J. C.*)

Artificial Immunization against Tuberculosis.—By means of the intracutaneous application of "an artificial primary focus" into guinea pigs and rabbits the authors believe they demonstrated the lack of danger from this method as well as their having produced an allergic and immune condition toward tuberculosis. The treated animals were completely protected against an exogenous superinfection even though they were susceptible to endogenous superinfection, if massive enough and produced by rupturing the artificial primary focus.—*Experimentelle Beiträge zur künstlichen Immunisierung gegen Tuberkulose, II. Mitt. Verwendung des künstlichen Primärherdes, Elisabeth Bajza and P. Kallos, Beitr. z. Klin. d. Tuberk., 1929, lxxi, 617.*—(*H. J. C.*)

Allergy and Immunity in Tuberculosis.—Both allergic and normal rabbits were infected with 0.0001 mgm. of bovine bacilli into the cornea. With the exception of the traumatic reaction, the normal animals did not show any alterations before the eighth day. Thereafter, the lesion progressed consistently, and by the twentieth day the maximal extent had not yet been reached. In animals which had been infected four or six weeks preceding the corneal infection, the local lesion was much more marked immediately following the reinfection. Animals reinfected after six weeks showed almost the identical process as normal animals, with the exception that the incubation period of eight days was absent. In conclusion, it may be said that allergy is manifested by a larger and more rapid reaction and that immunity is manifested by a limitation of the lesion around the reinfection focus.—*Über Experimentelle Beobachtung von Allergie und Immunität an demselben Tuberkulösen Reinfektionsherd, E. A. Schnieder, Klin. Wchnschr., December 17, 1929, viii, 2377.*—(*M. P.*)

Negative Tuberculin Hypersensitiveness in Adults.—Among 2,640 adults giving a negative Pirquet test the intracutaneous test with Old Tuberculin, 1:1000, revealed that 31 of them, or 1.17 per cent, were also negative by this method. It is concluded that 64 per cent of the tuberculin-negative cases occur between the ages of 14 and 20 years because they have not come in contact with tubercle bacilli. Again, 84 per cent of the

Pirquet negative cases gave a positive intracutaneous reaction.—*Zur Frage der negativen Tuberkulinhautempfindlichkeit beim Erwachsenen, K. Stetter, Beitr. z. Klin. d. Tuberk., 1929, lxxi, 706.*—(*H. J. C.*)

Effect of X-Rays on Tuberculin Skin Reaction.—The author determined the effect of X-rays upon the tuberculin reaction after raying the skin and the tuberculin. Varying intensities of roentgen ray were used, as well as different dilutions of tuberculin from 1:1,000 to 1:100,000 rayed from 7 to 10 days. The administration of the Old Tuberculin was intracutaneous. In the earlier experiments only the arm was rayed and, in general, there was a diminution in the intensity of the tuberculin reaction even though the diminution varied with the concentration of the solution and the various doses of roentgen ray. With raying of both the skin and the tuberculin there also was a diminution, and the 1:1,000 tuberculin revealed a more marked diminution than the 1:5,000 and 1:10,000.—*Der Einfluss der Röntgenbestrahlung auf die Intensität der Tuberkulinhautreaktionen, II. Mitt., T. Abramowitsch and I. Rabuchin, Zeitschr. f. Tuberk., 1929, lii, 495.*—(*H. J. C.*)

Use of Fermented Tuberculin.—The fermentation of tuberculin does not cause it to lose its specific properties, and skin reactions are more marked with the fermented than with the unfermented tuberculin.—*Die Hautreaktion bei gegorenem Tuberkulin, A. Komis, Beitr. z. Klin. d. Tuberk., 1929, lxxi, 709.*—(*H. J. C.*)

Temperature in Tuberculosis.—The author reports on 130 individuals on whom temperature studies were performed. The test was made by rectal readings, two hours after rest and following a quarter of an hour walking, with five-minute interval examinations until the temperature had returned to the initial reading. Short periods of exercise frequently, but not always, cause a rise in temperature in normal as well as tuberculous individuals, although this rise may be absent in cases of phthisis in quite a large percentage. As a whole, however, cases of phthisis showed more frequent and more prolonged temperature increases than normal. The temperature changes are a variable phenomenon; on one day they can increase 1.1 degree while on another in the same individual only 0.1 degree. No limits between normal and pathological were found. The greatest increase, 1.2°, was observed in a normal individual. The time required for the temperature to return to its original value is also markedly variable; in one and the same individual at one time it was 40 and at another 5 minutes, and this occurred in normal as well as tuberculous individuals. In individual cases a drop in temperature resulted from exercise and in others a delayed rise. No diagnostic value can be placed upon temperature records.—*Über den Einfluss der Bewegungen auf die Temperatur, besonders bei Tuberkulösen, C. H. Würtzen and C. Holten, Beitr. z. Klin. d. Tuberk., 1929, lxxi, 561.*—(*H. J. C.*)

Types of Fever in Tuberculosis.—To Breccia's classification of the twelve types of fever observed in tuberculous subjects, the author adds two others. The fever of nervous origin is commonly observed, especially in sanatoria. Although not directly due to the tuberculous process, the nature of the disease renders the nervous system of these patients highly responsive to all sorts of stimuli. Climatic changes in temperature, humidity, winds, barometric pressures and other meteorologic conditions also give rise to occasional unexplainable exacerbations of fever in patients suffering from tuberculosis.—*Di una forma poco conosciuta di febbre nei tubercolotici, A. Giovanni, Tubercolosi, xxi, April, 1929, 144.*—(*U. E. Z.*)

Premenstrual Temperature in Tuberculous Women.—The authors have reviewed the records of 363 tuberculous women who were discharged from the sanatorium apparently arrested or improved, with especial reference to the occurrence of premenstrual fever. The cases were classified according to the requirements of the National Tuberculosis Association. It was concluded that some premenstrual rise in temperature is shown by 42.4 per cent of tuberculous women. The extent of the tuberculous lesion seems to have no influence on the frequency with which this rise occurs. The rise in temperature varies from 1.29° F. in the moderately advanced cases to 1.41° F. in the minimal and 1.6° F. in the far-advanced cases. The time before the menses are established that the rise begins is about 9 days for all grades of tuberculosis. The temperature rise lasts from 7.38 days in the far-advanced cases to 8.81 days in patients with minimal tuberculosis.—*Premenstrual Elevation of Temperature in the Tuberculous Woman, E. M. Jameson, D. A. Bristol, and S. A. Cavenaugh, J. Am. M. Ass., July 5, 1930, xcv, 13.*—(*G. L. L.*)

Haemoptysis in Pulmonary Tuberculosis.—There is no routine treatment for haemoptysis. For the proper care it is

necessary to have a classification of the causes which will indicate the treatment necessary in each case. Some facts relating to haemoptysis follow: *1:* The amount corresponds neither to the extent nor to the activity of the disease. *2:* It may be severe and slight in the same patient at different times; it may occur frequently, or not at all. *3:* It may be the terminal or initial symptom. *4:* Severe haemoptysis may begin and end suddenly, or persist until death. *5:* Haemoptysis may occur in nonulcerative lung diseases. It is assumed that bleeding may be arterial or venous, from large or small vessels, and four clinical types are suggested: *1:* Aneurysmal, or large arterial haemoptysis is the only type liable to be fatal from the loss of blood. *2:* Ulcerative, or small arterial haemoptysis accounts for most slight but persistent bleeding. *3:* Accidental, or large venous haemoptysis is profuse, stops spontaneously, and is never fatal. *4:* Congestive, or small venous haemoptysis occurs in chronic cardiac cases, in bronchiectasis, in pregnancy, around caseous or calcified tuberculous foci, or foreign bodies. The author has seen haemoptysis of a pint or more as an initial symptom in apparently healthy persons, perhaps half of whom showed no radiological abnormality. In cases of severe haemoptysis the first objective is to reduce the blood-flow through the lungs, and the second is to clear the tubes. Warmth, avoidance of exertion, and semirecumbency are advocated. Use sedatives with caution. Physiological salt solution by vein, and calcium chloride intramuscularly may be of value. If the bleeding is arterial pneumothorax is instituted. In haemoptysis of less than a half-pint the source is assumed to be arterial if there is evidence of active tuberculosis. Expectorants are useful in venous bleeding, and morphine is not needed. Special treatment for tuberculosis is not necessary unless fever or other symptoms of activity are present.—*The Classification and Treatment of Haemoptysis in Pulmonary Tuberculosis, G. T. Hebert, Brit. J. Tuberc., April, 1930, xxiv, 71.*—(*R. M. F.*)

Subclavicular Pain.—The object of this paper is to point out the helpful significance of one symptom, which is pain in the subclavicular fossa. The occurrence of this symptom in cases which are otherwise doubtful generally signifies that the disease is above the diaphragm. The common source of origin of the phrenic nerve and the descending cutaneous cervical nerves is responsible for pain being referred to the top of the corresponding shoulder from the diaphragm. Five cases are reported.—*The Significance of Subclavicular Pain in Lesions Near the Diaphragm, Z. Cope, Brit. M. J., March 1, 1930, no. 3608, 383.*—(*W. I. W.*)

Alimentary Hyperglycaemia in Tuberculosis.—The author gave 109 cases of pulmonary tuberculosis 100 to 200 gm. of sugar in 250 to 500 gm. of tea in order to study the presence of alimentary glycaemia. The blood-sugar determinations were made by the Hagedorn-Jensen method. In subcompensated and decompensated cases the sugar values were increased, while no relation was found between the sugar values and the constitutional types. The duration of alimentary hyperglycaemia persisted longer in 10 cases of tuberculosis than in healthy individuals On the basis of this carbohydrate metabolic disturbance an excess of carbohydrate in the diet is warned against in subcompensated tuberculosis. No definite relation between pathological changes in the organs of internal secretion and the blood-sugar values was found.—*Alimentäre Hyperglykämie und Assimilation der Kohlehydrate bei Tuberkulosekranken, W. Chiebnikow, Beitr. z. Klin. d. Tuberk., 1929, lxxi, 216.*—(*H. J. C.*)

Physical Signs in Pulmonary Tuberculosis.—Comparing the writings of Laennec with those of the most recent authorities, one is surprised to find how little advance has been made in the interpretation of physical signs. Laennec distinguished four types of râles, as follows: (1) moist râles, or crepitations; (2) mucous râles, or gurgling; (3) dry sonorous râles, or snoring; (4) dry sibilant râles, or whistling. The explanation of the mechanism of these râles is practically the same as that given in Norris and Landis's text-book. Further elaboration of physical diagnosis is due to the work of Magendie, Bigelow, Skoda, Bushnell, etc. Real progress, revolutionizing the interpretation of physical signs, was made after the introduction of roentgenography. Due to roentgenological controls it has been possible to define more clearly the borderline between pathological and normal changes in the percussion sound. Roentgenography has demonstrated the fact that physical signs are frequently inadequate to detect cavitations and that even large cavities may heal. Whether cavities can be detected by physical signs or not depends less on the size than on the location of the structural nature of its wall. It is now conceded by most authors that annular shadows are practically always due to cavities, although a few exceptional cases are on record in which autopsy control has proved that they were not caused by cavities. Another important knowledge is due to roentgeno-

logical studies, namely, the facts that râles may be present without infiltrations, that they may persist after an infiltration is completely resorbed, that their character may be the same in pneumonic, caseous, fibrotic and healed lesions. The conclusion had to be made that râles do not indicate activity and that they are not indicative of pulmonary tuberculosis unless corroborated by other evidence. Brun's experimental studies on cadavers led him to distinguish the following types of râles: (1) coarse, gurgling râles, heard over cavities, both on inspiration and expiration; (2) coarse bubbling râles heard over the trachea and large bronchi, both on inspiration and expiration; (3) medium-sized râles, heard during inspiration and also during expiration, without cough, and changeable in character: all these three types of râles are due to moisture; (4) sonorous and sibilant râles, caused by tenacious moisture in large bronchi; (5) fine crackling and crepitant râles, heard synchronously with the inflation of the subpleural lobules; and (6) medium or fine râles, often heard over normal areas when collapsed parenchyma becomes expanded by air, and heard only during inspiration. This latter type of râles, called parenchymal râles by Bruns and typical indeterminate râles by Bushnell, is not due to abnormal secretions in the bronchi, but to the expansion of partially collapsed parenchyma, the collapse being caused by tubercles in the neighboring lobules, by fibrous bands, or by pleural adhesions. These râles must be elicited by expiratory cough, they occur only during inspiration, they are always of the same size, they are not changeable in character and location, they are crackling, and they may persist indefinitely. They are, then, only suggestive of pulmonary tuberculosis; and their proper diagnostic evaluation depends on the corroborative evidence of other physical signs, symptomatology and roentgenological findings. *Conclusions:* Moderate apical dulness and moderate changes in breath-sounds should usually be ignored. Too much refinement in physical diagnosis often leads to error. More than 50 per cent of cavities can be diagnosed only roentgenologically. Parenchymal râles are found in about 90 per cent of all tuberculous lungs; other types of râles usually indicate complications. Fibrosis or healing has the same effect on the production of parenchymal râles as has increased infiltration. Nevertheless these râles are still the most important physical sign of pulmonary tuberculosis, but they must be adequately interpreted in conjunction with other physical and roentgenological findings and with symptomatology.—*Recent Advances in Interpretation of Physical Signs in Pulmonary Tuberculosis, L. H. Fales, Southwest. Med., May, 1930, xiv, 221*—(*M. P.*)

Diagnosis of Tuberculosis.—Physicians are recognizing the fact that the diagnosis of pulmonary tuberculosis does not depend upon the finding of tubercle bacilli in the sputum. No sign or test is invariably present or pathognomonic, and it is probable that the diagnosis will never be dependent upon such a criterion. The clinical and pathological manifestations of the disease are so varied as to simulate several different diseases. They seem to have little in common except the bacillus that produces them, and this factor offers no hope of being the key to the solution of the diagnostic problem. This problem is to determine to what extent the patient's illness is due to his tuberculous process and to find all possible aetiological factors and associated conditions with a view to formulating such therapy as is necessary to clinical improvement. Cases primarily and purely tuberculous, not involving the influence of environment or other diseases, such as those caused by heavy doses of early infection or excessive allergy or low immunity, or the localization of metastatic reinfection in vital areas, are relatively in the minority in the general population. Some items of knowledge necessary for the adequate recognition of tuberculosis follow: *1:* Practically all persons harbor tubercle bacilli, which may produce disease when the body condition favors it. *2:* Accidental factors, such as massive dosage of bacilli and location of lesions, may determine between silent infection and severe illness. *3:* Allergy is responsible for clinical symptoms through sensitization of the body to the protein of the tubercle bacillus. The severity of the allergic symptoms varies directly with the amount of tuberculoprotein being absorbed, and directly with the degree of the patient's sensitization to the protein. *4:* Immunity, about which little is known, is some property of the tissues by virtue of which the tubercle bacillus is unable to survive there. *5:* The sensory or affector response from a central neurone to afferent stimuli coming from an inflamed or irritated viscus constitutes a visceral reflex. The effector phenomena of visceral reflexes produce visible and palpable changes in the patient's exterior, and can be used as diagnostic evidence. Effector phenomena may also appear in other viscera. *6:* In most cases tubercle bacilli are acquired in small doses, cause no symptoms, and become encapsulated. Illness does not occur unless some episode in the host's life causes the capsule to become permeable to the enclosed

bacilli. The subsequent reinoculations set up allergic as well as immune reactions. In the person ill with tuberculosis the process differs in degree only, not in kind. Diagnostic efforts must consist of a complete study of the patient's body, personality, history and environment.—*Tuberculosis: the Nature of the Diagnostic Problem, M. J. Breuer, Ann. Int. Med., June, 1930, iii, 1272.*—(*R. M. F.*)

Diagnosis of Pulmonary Tuberculosis.—The diagnosis and treatment of pulmonary tuberculosis are discussed. Special emphasis is placed on the history, sputum examinations, and X-ray studies.—*The Diagnosis and Treatment of Pulmonary Tuberculosis, W. A. Dickson, Brit. M. J., March 1, 1930, no. 3609, 376.*—(*W. I. W.*)

Early Diagnosis of Pulmonary Tuberculosis.—It is difficult to determine the incipient stage of pulmonary tuberculosis. The primary infection usually does not cause clinical disease. Secondary foci are frequently located in the apical parts, and they have been called, customarily, incipient tuberculosis. But with a greater refinement in examination, this diagnosis of incipient tuberculosis increased in frequency, until it was finally found by autoptic examination that about 90 per cent of the urban population harbor tuberculous foci in their apices. Since it is, however, a much smaller percentage of the population that develops clinical disease, it is unjustifiable to identify all apical foci with incipient disease, or to declare the bearers of such foci as being particularly in danger of developing clinical disease. It is the task of a careful differential diagnosis to evaluate properly secondary pulmonary foci regardless of their localization. Bard and Piery in France, and Neumann in Vienna, have attempted such a differential diagnosis. But the multiplicity of their clinical forms, and the high requirements of diagnostic skill which these systems presuppose, made them inapplicable to the work of the practioner who is most frequently in a position to render a diagnosis of incipient tuberculosis. It has been shown that many patients with so called active tuberculous apicitis, never developed progressive disease, while many destructive lesions were found in patients without previous signs or symptoms of an apicitis. Early diagnosis is imperative in malignant forms; and it is in these forms that it is so frequently missed. They begin as a rule not with multiple small apical foci but with an infiltration (the so called "early infiltration"), usually not in the apices. A large proportion of early infiltrations is not diagnosed without roentgenograms, but roentgenological examinations cannot be done routinely by the practitioner. Frequent roentgenological examinations have revealed a number of symptoms of diagnostic importance which heretofore have been neglected or misinterpreted. According to the symptomatological onset, three groups may be distinguished: *1:* Cases beginning acutely with high temperature, and progressing with febrile exacerbations: the "grippe-like form." *2:* The "bronchitic form" which begins without or with very small elevations of temperature and which is characterized by cough of long duration with varying amounts of sputum. *3:* The "haemoptoic form." Typical, brief histories of each type are reported. In a total of 97 observed patients, the bronchitic form was most frequently seen. The later clinical course is essentially the same in all three types. Pathologicoanatomically, they all show a development from early infiltrations with subsequent excavation and bronchogenic spread. The frequent failure to diagnose such patients during the incipient stage of their disease is due to the fact that their diagnostically important early symptoms do not coincide with the classical symptoms of tuberculosis and are therefore considered insignificant; this misinterpretation is particularly true of fever and sputum. Fever is, wrongly so, considered as indicative of tuberculosis only when it is of long duration. In the practical diagnosis attention should be centered first on such symptoms as are easily recognized. Symptoms of suggestive significance are aetiologically unexplained fever of short duration, particularly when it recurs, languor, loss of weight, cough (nonspecific bronchitis, not associated with asthma, is very rare in young adults) and sputum. Sputum may be very scant, but it frequently contains tubercle bacilli at an early stage. Haemoptysis is not an early occurrence, strictly speaking. An increased sedimentation rate of red cells is suggestive, but it may be normal in the presence of cavities. The physical signs of early lesions are vague; findings in the extreme apices are unimportant. Measurements of the vital capacity show a decrease in accordance with the extent of the involvement.—*Ueber die Diagnose der beginnenden Lungentuberkulose, H. Kutschera-Aichbergen, Wien. klin. Wchnschr., May 29, 1930, xliii, 685.*—(*M. P.*)

Early Diagnosis of Pulmonary Tuberculosis.—The absence of pulmonary lesion should be established before haemoptysis is declared to be of nonpulmonary origin, even when a possible nonpulmonary source is demonstrable. Absence of cough is no contraindication to a diagnosis of pulmonary

tuberculosis. Mild anorexia, nausea or vomiting should suggest a search for pulmonary tuberculosis as the possible (or probable) source. Persistent slight daily elevation of temperature of the inverse type (high in the morning) is suggestive of tuberculosis, as is slight early loss of weight, although through forced feeding the early case may lose no weight. Sweating occurs in the early stages at times, but it is greatly overrated as an important symptom. Fatigue is a very important symptom, as is vague thoracic pain. Signs are meagre in early stages, but thoracic movements, especially lagging of one side, should arouse suspicion. A comparable percussion note at the apices, or a change in Krönig's isthmus may be early signs. Auscultatory signs other than râles are usually slight early in the disease, but the râles must be carefully distinguished from muscle sounds. It is highly important to examine the axillae as well as the apices carefully for râles. Tubercle bacilli should be sought for repeatedly, for they are usually absent in early tuberculosis. The X-ray, if depended upon as a corollary to the examination, may be very helpful in pointing to a diagnosis of early tuberculosis.—*The Significance of Certain Symptoms and Signs in the Early Diagnosis of Pulmonary Tuberculosis.—J. B. Alexander, J. State Med., May, 1930, xxxviii, 284.*—(*H. S. W.*)

Errors in Diagnosis of Tuberculosis.—This paper consists of 15 brief clinical reports in all of which the initial diagnosis on admission was found to be erroneous. In the following list, the correct diagnoses are given, followed by the wrong initial diagnosis in parentheses: (1) syphilis of the vertebrae, (tuberculous spondylitis); (2) gumma of the skin (tuberculosis of the skin); (3) syphilis of the shoulder joint (tuberculous arthritis); (4) luetic laryngitis (tuberculous laryngitis); (5) mitral stenosis (apical tuberculosis, left); (6) aneurysm of the ascending aorta and paresis of the recurrent nerve (tuberculosis of the left upper lobe and tuberculous laryngitis); (7) chronic recurrent endocarditis (bilateral apical tuberculosis); (8) cancer of the upper lobe (tuberculosis of the upper lobe); (9) mediastinal lymphogranuloma (tuberculosis of upper and middle lobe); (10) Bechterew's spondylosis (tuberculous spondylitis); (11) tuberculous spondylitis and cold abscess (abdominal hernia and purulent myositis); (12) Douglas abscess and appendicitis (spondylitis and cold abscess); (13) perinephritis (spondylitis); (14) tuberculous spondylitis (sciatica); (15) cerebral abscess following chronic pneumonia and bronchiectasis (tuberculosis of the lower lobe).—*Differentialdiagnostische Erwägungen und Beobachtungen bei pulmonaler und extrapulmonaler Tuberkulose, H. Maendl and E. Waltuch, Wien. klin. Wchnschr., July 24, 1930, xliii, 939.*—(*M. P.*)

Errors in Diagnosis of Pulmonary Tuberculosis.—It is common knowledge that patients with pulmonary tuberculosis often lose much, if not all, chance of returning to a reasonably active life because of delays in diagnosis. The National Tuberculosis Association has endeavored to find the causes responsible for this delay. The present report is concerned with the various diagnoses given patients in the course of their illness that finally brought them to a sanatorium. It comprises the experiences of 1,499 patients. Of these, 20 per cent received the correct diagnosis at their first consultation, and many others as soon as the physician was able to ascertain the results of sputum and X-ray examination. However, in 1,199 instances the physician told the patient his ailment was something else. In 114, or 9.5 per cent, the diagnosis of influenza was given, while in 103, or 8.6 per cent, the trouble was blamed on some part of the digestive system. In 99 cases ill-defined diagnoses, such as overwork, malnutrition, mixed infection, etc., were given. Thyroid disease was diagnosed 9 times. In 18 instances patients were told that haemorrhages did not come from the lung. The need for better and more intelligent diagnosis is apparent.—*On Diagnosing Tuberculosis as Another Condition, L. R. Williams and A. M. Hill, New England J. M., August 28, 1930, cciii, 418.*—(*A. P.*)

Sputum Examinations in Tuberculosis.—Antiformin procedures are time-consuming and worthless. The determination of elastic fibres is positive in about 99 per cent of definite cases. In many cases the appearance of elastic fibres in the sputum precedes that of tubercle bacilli and this is important for the early diagnosis of destructive processes. During the course of treatment the elastic fibres disappear earlier than the tubercle bacilli in the sputum.—*Sputumuntersuchungen Tuberkulöser, Elisabeth Bajza, Beitr. z. Klin. d. Tuberk., 1929, lxxii, 202.*—(*H. J. C.*)

Value of Sputum Examinations in Tuberculosis.—In examinations of the sputum the author includes a description of the macroscopic sputum, as well as a Ziehl preparation and one stained with iron-alum-eosin after moist fixation. In addition the amount of sputum is measured each day. In order to avoid the effect of autolysis and bacterial disintegration the fresh sputum

in sterile petri dishes was used. During a period of three months 60 individuals were examined, 2,300 analyses being made. It was concluded that the examination of moist preparation is of considerable value and that, even though inexact, a study of the cell-forms in the sputum is worth while. Cytological examination alone is of little value, but combined with macroscopic and bacteriological findings is worth while. A predominance of monocytic cells over macrophages is an index of a fresh inflammatory process. An eosinophilia in the sputum upon initiating an irritating therapy is prognostically favorable.—*Fortlaufende cytologische Untersuchungen des Auswurfs bei chronischer Lungentuberkulose, O. Mühlberg, Beitr. z. Klin. d. Tuberk., 1929, lxxi, 657.*—*(H. J. C.)*

Dark-Field Examination of Tuberculous Sputum.—The author maintains that the dark-field illumination method is less fatiguing in looking for tubercle bacilli than the ordinary methods of examining stained smears. The rods in the dark field are more easily seen, and appear to be more numerous than by transillumination. Sputa ordinarily found free from bacilli were also negative by the dark-field method. Aside from these conditions the dark-field method possesses no advantages over the ordinary procedures.—*Zur Frage des Bacillennachweises im tuberkulösen Sputum mittels der Dunkelfeld-Methode, S. v. Stubenrauch, Zeitschr. f. Tuberk., 1929, liii, 122.*—*(H. J. C.)*

Cultural Methods in Diagnosis of Tuberculosis.—In a comparative study of the efficiency of "cream," "milk," and Corper's media, for the cultivation of tubercle bacilli, it was found that the "milk" medium is equal to, and the "cream" medium superior to other media for the primary isolation and rapidity of growth of all types of bacilli. The preparation of "cream" and "milk" media is given in detail. Uncontaminated specimens may be placed on the media without any preparation. Contaminated specimens are treated with 3 per cent hydrochloric acid or 3 per cent sodium hydroxide, for twenty-five minutes. Growths on these media are obtained from three to sixteen days after inoculation. Atypical strains contaminated with spore-forming microörganisms are difficult to culture and need animal inoculation as a supplementary procedure.—*The Value of Culture in the Diagnosis of Tuberculosis, H. C. Sweaney and M. Evanoff, Tubercle, June, 1930, xi, 404.*—*(M. E. P.)*

Oral Injection of Lipiodol—Advanced basal bronchiectasis usually presents a clearly defined clinical picture. Upper lobe bronchiectasis, however, may closely resemble chronic fibroid tuberculosis. Apart from the absence of tubercle bacilli in the sputum such a diagnosis would seem justified. Continuous drainage obtains, the sputum is less copious and offensive, there is less constitutional disturbance than in the basal type, and there may be no clubbing of the fingers. Râles are dry in quality. The use of lipiodol aids to differentiate from tuberculosis and in suitable cases oral administration is the method of choice. Coöperation of the patient is essential, and unless a clear view of the larynx can be obtained it is useless to proceed. No anaesthesia is used. The patient reclines on the side to be injected, supporting his head with his arm and leaning on his elbow. The foot of the table is slightly lowered. A 20-cc. syringe fitted with a straight cannula, 10 cm. in length and 2 mm. in diameter, is filled with warm lipiodol. The patient holds out his tongue with a cloth and breathes through his mouth. The proximal end of the cannula is steadied against the upper jaw and the distal end projected into the space between the tonsil and the uvula. A few drops of oil are injected during each inspiration; none during expiration. If the injection is proceeding properly a slight gurgling sound indicates that the oil is passing down the trachea. A completely silent injection indicates that the oil is swallowed. As soon as the injection is finished the table is tilted head downward to ensure flow of the oil to the summit of the lung. The patient remains in a horizontal position until the first X-ray has been made. One case of right upper-lobe bronchiectasis diagnosed by this method is described in detail, and illustrative X-rays are reproduced. In this case a test for iodine tolerance was done prior to the lipiodol injection.—*The Oral Injection of Lipiodol as an Aid to the Differential Diagnosis of Upper Lobe Bronchiectasis and Pulmonary Tuberculosis, W. Burton Wood, Lancet, June 21, 1930, ccxviii, 1339.*—*(R. M. F.)*

Bronchograph in Differential Diagnosis.—The differential diagnosis between upper-lobe tuberculosis and bronchiectasis in the upper lobe in the majority of cases cannot be determined by clinical examination, and only the roentgenograph, especially the bronchograph, gives the correct diagnosis. The author reports cases in which the clinical findings led to the conclusion that there existed a pulmonary tuberculosis of exudative character, while the roentgen picture following iodopin filling revealed bronchiec-

tasis originating from repeated pneumonias. —*Die Bedeutung der Bronchographie für die Differentialdiagnose "Oberlappentuberkulose" oder "Bronchiektasien im Oberlappen", H. Knüppel, Zeitschr. f. Tuberk., 1929, liii, 299.*—(*H. J. C.*)

Complement-Fixation in Tuberculosis.—Complement-fixation tests, according to the methods of Besredka and Klopstock-Neuberg, as a rule gave negative reactions with healthy individuals and inactive cases of tuberculosis. In cases of chronic phthisis and in tuberculous conditions during the course of phthisis which could be associated with the third allergic period, the majority gave positive reactions. A variable reaction occurred, half positive and half negative, in the cases in which there was an infiltration closely associated with that of the second allergic period, especially also in surgical tuberculosis. The authors believe the reaction valuable diagnostically as well as prognostically.—*Die Verwertbarkeit der Komplementablenkungsreaktionen nach Besredka und Klopstock-Neuberg bei der Beurteilung gewisser allergischer Zustände, F. Loben and K. Glaum, Zeitschr. f. Tuberk., 1929, liii, 32.*—(*H. J. C.*)

Goldenberg's Complement-Fixation in Tuberculosis.—In tuberculosis and a number of other diseases the activity of the normal haemolysins present in the serum is increased. Goldenberg's method is based on the observation that the haemolytic amboceptor can be specifically deviated. Its method is a modification and simplification of Besredka's test, whose antigen is used. The results compare closely with those obtained with the Besredka method but it is slightly less sensitive.—*Einfaches Tuberkulosekomplementbindungsverfahren mit aktivem Serum nach Goldenberg, H. Schulte-Tigges, Beitr. z. Klin. d. Tuberk., 1929, lxxi, 332.*—(*H. J. C.*)

Vernes Resorcin Test.—The Vernes resorcin test was found to be nonspecific. Positive findings occurred in cases in which all the other clinical methods of examination proved the diagnosis not to be tuberculosis. Among 27 per cent of unquestionable cases of tuberculosis the reaction was negative while, on the other hand, 64 per cent of nontuberculous cases gave positive reactions. —*Der Diagnostiche Wert der Vernesschen Resorcinreaktion, A. Woldrich, Beitr. z. Klin. d. Tuberk., 1929, lxxi, 159.*—(*H. J. C.*)

Red-Cell Sedimentation Test.—The conclusions drawn from two thousand sedimentation tests on one thousand patients with pulmonary tuberculosis are that it possesses definite prognostic value, that it is an index of the tissue destruction and a guide to therapeutic effects, and that it is a herald of approaching calamities in the nature of complications. However, the test needs universal uniformity in apparatus, method and technique, before its real value can be appreciated.—*The Real Value of the Sedimentation Test in Pulmonary Tuberculosis, G. I. Davies, Tubercle, July, 1930, xi, 450.*—(*M. E. P.*)

Tuberculous Adenitis with Dermal Bullae.—A case is reported of a man, forty-one years of age, with enlarged cervical lymph nodes and a cervical abscess. This abscess ruptured spontaneously and the pus contained enormous numbers of tubercle bacilli. In addition, there existed extensive and atypical lesions on the forearm resembling a low-grade pyogenic infection, but containing tubercle bacilli in the pus of an unruptured bulla. There was no evidence of pulmonary tuberculosis.—*Tuberculous Adenitis with Dermal Bullae, R. C. Holderness, Brit. M. J., August 30, 1930, no. 3634, 319.*—(*M. E. P.*)

Tuberculosis of Tongue.—The authors report a search of the literature for records of lingual tuberculosis, and have discovered 334 cases recorded up to March, 1929. In more than 5,300 autopsies performed by various men on tuberculous subjects, only 28 cases of tuberculosis of the tongue were reported. The largest number occurred after the fortieth year. Males were more frequently affected than the females, in the ratio of 6 to 1, lending strength to Feldman's suggestion of sex susceptibility. The youngest patient on record was 5½ years old. Cases of lingual tuberculosis do not present distinct or differing anatomicopathological types; they simply show diverse forms of the same process manifesting different morphological aspects as influenced by various factors. In the early stage of the disease, if diagnosis is limited to physical observation, it generally proves difficult. Histobiological examination of excised tissue is the only positive diagnostic criterion. The lesion is usually associated with tuberulosis in other parts of the body, generally the lungs. It is improbable that primary tuberculosis of the tongue is of frequent occurrence, although readily indicated experimentally. The prognosis is always unfavorable.—*Tuberculosis of the Tongue: Report of Three Cases, R. D'Aunoy and J. M. Miller, J. Am. M. Ass., July 12, 1930, xcv, 97.*—(*G. L. L.*)

Tuberculosis of Thyroid.—The author reports 3 cases of tuberculosis of the thyroid gland in which the diagnosis could not be made before operation. In one case there was Basedow's disease with enlarged thymus, in another a nodular struma causing disturbance in swallowing and respiration, and in the third case inflammatory findings. Symptoms can be completely absent or can resemble those of any of the diseases of the thyroid gland, so that in most cases it is impossible to make an exact diagnosis. The presence of more or less widespread tuberculosis elsewhere makes possible a presumptive diagnosis in such cases.—*Weiterer Beitrag zur Kenntnis der Tuberkulose der Glandula thyreoidea, L. Frassi, Deutsch. Zeitschr. Chir., 1929, ccxiii, 416.*—(*H. J. C.*)

Treatment of Laryngeal Tuberculosis.—A preliminary report is given to indicate the value of coöperation between the phthisiologist and laryngologist. Strandberg has secured healing in 55 per cent of cases of laryngeal tuberculosis treated with universal carbon arc-light baths, sometimes combined with local surgery, at the Finsen Institute. His cases were controlled by a lung specialist but got no special treatment for their pulmonary lesions. Gravesen and Godbey recently published statistics showing that the results of treatment of laryngeal tuberculosis at the Finsen Institute were better than those obtained at the Vejlefjord Sanatorium, while in the case of pulmonary tuberculosis the results were opposite. Coöperation between the two was begun three years ago. All cases of laryngeal tuberculosis diagnosed at once received light baths unless special treatment for the lungs necessitated postponement. The carbon arc of 25 amperes, in series of three, was employed. Exposure began at 5 minutes and gradually increased to a maximum of 90 minutes four times a week. The larynx got no other treatment until the patient was afebrile, gained weight, and had sedimentation tests showing a steady fall. Vocal rest was used. Local treatment may harm if done too early. Special treatment of the lung was used simultaneously. Fever often occurs at the beginning and subsides during the course of light baths, and is not a contraindication. Quicker cavity-formation was observed and considered only a speeding of an inevitable developmental phase. Collapse therapy is employed when desirable. Sixty-nine cases with lung and laryngeal tuberculosis are reported. Of these, the larynx was ulcerated in 47, and infiltrated without ulceration in 22. Four cases died. Of these, the laryngeal lesion was worse in 1, improved in 1, and healed in 2. Of the 65 discharged cases, the laryngeal lesion was worse in 1, stationary in 1, improved in 4, and healed in 58. Thus 84 per cent were discharged with clinically healed laryngeal lesions. The average number of light baths in the "cured" cases was 57. Local surgical treatment was done one or more times in 12 cases. Five of the discharged cases died later. Thus 53 cases were left for observation, as follows: 17 for less than 6 months, 19 from 6 to 12 months, 14 from 1 to 2 years, and 3 for more than 2 years. The net result of sanatorium treatment in 61 cases discharged with healed laryngeal affection is as follows: Much improvement in lung condition with 6 consecutive negative sputum examinations within 6 weeks in 30 cases; progressive disease in 3 cases; and death in 2 cases Out of 55 positive sputum cases tubercle bacilli disappeared permanently in 26, or 47.3 per cent. Combined physical and X-ray examinations at the beginning and end of light treatment showed the following: Much improvement in lungs in 39 cases; no change in 15; and worse in 7. A sedimentation test done in 57 cases with healed laryngeal lesions showed an average of 28 mm. in one hour before light treatment and 11 mm. afterward. The combined treatment here advocated, when done in a sanatorium, gives a percentage of cures 30 points higher than in cases having special treatment for the laryngeal complication only. The social difference between the two groups studied should not be considered to have any influence on the percentage of the primary healing.—*Results of Treatment of Laryngeal Tuberculosis at Vejlefjord Sanatorium, Denmark, O. Strandberg and J. Gravesen, Brit. J. Tuberc., April, 1930, xxiv, 67.*—(*R. M. F.*)

Administration of Spleen in Laryngeal Tuberculosis.—Various experimenters have shown that splenic tissue given by mouth may mitigate a tuberculous infection. Fliegel administered raw or slightly cooked spleen to patients with tuberculous arthritis with fistulae. He reported strikingly good results. Accordingly, the same therapy was instituted in several cases of laryngeal tuberculosis. The number of patients treated in this way is too small to arrive at definite conclusions, but the improvement which was noted is suggestive. In most patients the weight increased markedly, and both pulmonary and laryngeal lesions showed objectively demonstrable retrogression.—*Milztherapie bei Kehlkopftuberkulose, F. Hutter, Wien. klin. Wchnschr., November 28, 1929, xlii, 1513.*—(*M. P.*)

Thoracic Cold Abscess.—Pott's disease of the dorsal vertebrae may cause a thoracic

cold abscess and its diagnosis may at times be very difficult without the injection of lipiodol into the abscess cavity. Another class of abscess may be secondary to pleural or pleuropulmonary lesions. This article considers a series of 45 cases of thoracic cold abscess of which 35 arose from the ribs or cartilages, while only 10 originated in the thoracic soft parts. In this series the incidence was greater in childhood than in adult life (38 cases in children, 7 in adults). In cold abscess of costal origin at first only one rib is involved. Soon the periosteum is destroyed and the bone ulcerates, forming a cavity containing several sequestra. By direct continuity new foci may develop in the same and adjacent ribs. The pleura rarely escapes injury, a pachypleuritis often being present subjacent to the costal lesions. In examining an abscess the centre of the fluctuating mass can be depressed, and a cushion-like effect is felt at the periphery. Here also most pain is experienced and this is aggravated by cough or deep inspiration. Fever may be present, although usually constitutional symptoms are entirely absent. In early cases expectant treatment is most advisable, as the abscess may resolve, but should it remain longer than from three to six months, a subperiosteal resection should be done. In long-standing cases with extensive pathological involvement a total *debridement* is necessary with prolonged postoperative care to effect ultimate cicatrization of the wound. Cold abscess of the thoracic soft parts may arise from the subcutaneous tissue, the muscular interspaces or from the lymph nodes. At times the abscess may resolve after aspiration, but complete excision and drainage are usually required. As the tubercle bacillus is rarely found on direct smear, cultures of the pus on Petroff's medium should be made. This often renders animal inoculation unnecessary. After tuberculosis is definitely established one must locate the origin of the abscess. Lipiodol injection may reveal the presence of Pott's disease. In pleuropulmonary affections, cold abscesses of the soft parts of the thoracic wall are often secondary to acute purulent pleurisies. An abscess may also result from disease of the contiguous ribs or cartilages. In addition to surgical intervention, heliotherapy and climatic treatment are advised to increase the general resistance of the patient. Vaccines, tuberculins and chemotherapy give unsatisfactory results.—*Abcès froids thoraciques, E. Sorrel and M. Sayag-Dromer, Arch. Méd.-Chir. d. l'Appar. Respir., July, 1929, iv, 314.*—(*J. G.*)

Unilateral Atrophy of Mammary Gland in Pulmonary Tuberculosis.—In about 75 per cent of all women with practically unilateral pulmonary tuberculosis, atrophy of the mammary gland on the diseased side was observed. It must be borne in mind that the mammary gland is frequently slightly larger on the right side in normal women. The atrophy caused by pulmonary tuberculosis may be apparent already in the incipient stage. The distance between the sternoclavicular joint and the mammilla is a reliable index for the size of the gland. This distance is frequently reduced on the diseased side in men with pulmonary tuberculosis.—*Ueber einseitige Mammaatrophie bei lungenkranken Frauen, B. Kokali-Kowalewska, Wien. klin. Wchschr., October 31, 1929, xlii, 1410.*—(*M. P.*)

Tuberculous Mediastinitis.—Five cases of tuberculosis occurring in adults, in which the disease was predominant in the mediastinum, are reported. The clinical aspects and roentgenologi al findings were those of mediastinal involvement. While tuberculosis of the mediastinum is usually confined to the tracheobronchial lymph nodes there was in this group of cases reasonable evidence that the disease had extended beyond the limits of the lymph nodes to involve the various mediastinal structures. Attention is called to this localization of the disease as a distinct clinical entity. The importance of tuberculous mediastinitis in a differential diagnosis of mediastinal disease is emphasized.—*Tuberculous Mediastinitis, K. Kornblum and D. A. Cooper, Am. J. Roentg. & Rad. Ther., March, 1930, xxiii, 276.*—(*W. I. W.*)

Spontaneous Pneumothorax.—In many cases the aetiology of spontaneous pneumothorax is obvious, but in quite a large number it is obscure. Particularly is this so in the so called benign or idiopathic variety. This may come on without any apparent cause, after effort, or while the patient is in good health and feeling well. In France it has been called the pneumothorax of conscripts because of its high incidence in male subjects of military age. Of the 66 cases with favorable outcome reported by Nikolsky, 57 were cured within two months, 6 in three months and 3 in four months. According to Gaillard the usual duration is twenty-eight days. Cases are cited from the literature showing that the duration may be many years. In recurrent pneumothorax healing may take place without leaving a residue. Frequent recurrence may be bilateral. The relapse is due to the making of a new fistula or the reopening of the old one. In treatment, dilute and strong solutions of silver nitrate and 30 per cent solution of

glucose have been used in the hope of stimulating fibrosis of the fistula. Other recommended forms of treatment are keeping the lung collapsed a long time by means of artificial pneumothorax, or, when the opening can be determined, fixing it to the chest-wall and suturing it. Tuberculosis is the cause of bilateral pneumothorax in 58 per cent of cases and cicatricial emphysema in 16.6 per cent. It may occur successively or simultaneously on both sides. The latter in extremely rare cases may be due to the simultaneous introduction of air in both sides. The more common mode of development is the appearance of pneumothorax on the opposite side before the complete absorption of air from the other. Theoretically it is possible to have a congenital hiatus in the pleura. Fistulization of the mediastinum in the course of artificial pneumothorax has been described and proved at autopsy by J. Walsh. Reference is made to 18 cases with a tuberculous aetiology and a fatal termination. In the other cases reported, asthma, emphysema and cancer metastases were the causal factors. Perforation of the second lung may be favored by vicarious emphysema making its appearance in this organ following the suppression of the active function of the first lung. This theory is not accepted, inasmuch as a necessary corollary would be a great frequency of this condition which does not exist. The most plausible view is a defect, congenital or acquired, involving the periphery of the lung. In the literature tuberculosis is credited as the cause in 60 to 90 per cent of cases; consequently the incidence of non-tuberculous cases varies from 10 to 40 per cent. In the order of frequency these latter are lung abscess, trauma, emphysema, hydatid cysts of the lung, and bronchiectasis. In the author's hospital service of 7,150 patients 2,200 suffered from pulmonary diseases. Among these there were 10 cases of spontaneous pneumothorax: 6 were due to tuberculosis, 1 to lung cancer, 1 to bronchiectasis, and 2 were of the benign idiopathic type. In the outpatient department spontaneous pneumothorax was seen 17 times among 5,500 patients: in 5 tuberculosis was the cause, in 3 divers conditions, and 9 were idiopathic. These figures are interesting since they show that in ambulatory cases tuberculosis is not the commonest cause. The most generally accepted view of the aetiology of idiopathic pneumothorax is that it is the result of rupture of a minimal superficial tubercle. The complete absence of all subjective and objective findings of tuberculosis and the infrequency of subsequent development of clinical tuberculosis is evidence against this theory. The effusions in these cases are probably mechanical and benign. Generalized emphysema is mentioned as a factor. This condition is common in old age, but spontaneous pneumothorax is very rare. In the young, pneumothorax is common but emphysema is very rare. Circumscribed emphysema is common at all ages and is frequently seen at autopsy when it is independent of the cause of death. Molon reported a case of spontaneous pneumothorax occurring first on the right side and then on the left. At autopsy tuberculosis was only found on the left side and the site of rupture was in an area of lung free from tuberculosis. Hayashi at autopsy of three cases showed the cause to be rupture of old apical scars resulting from healed tuberculosis. Can strain be considered a cause of spontaneous pneumothorax? It may, but in the majority of cases a pathological lesion exists. This is of more than theoretical interest as the question might arise under the Workmen's Compensation Act. Other aetiological factors may be congenital defects and polycystic disease of the lung. Certain constitutional and anatomical dispositions may favor it. Congenital absence of a lung may simulate spontaneous pneumothorax as shown by Hedblom. From the foregoing it is obvious that the question of aetiology is not definitely decided. Twenty-nine case histories are given and several are illustrated by X-ray pictures. These are divided into two main groups, hospital and outpatient. Among the hospital patients there were 10 cases of spontaneous pneumothorax. In 6 the aetiological factor was tuberculosis and all but one ended fatally: in 1 cancer was the cause and bronchiectasis was the underlying lesion in another. Both of these ended fatally. There were 2 so called idiopathic cases and both got well. Among the outpatients, in 5 tuberculosis was the cause: three recovered and two died. Chronic bronchitis, cancer and splenopneumonia were each responsible for one case. There were 9 idiopathic cases and all recovered and some subsequently developed clinical tuberculosis. Two other cases of the benign or idiopathic type are presented. Both got well and neither presented evidence of tuberculosis.—*Le pneumothorax spontané "idiopathique" bénin, E. Olbrechts, Ann. d. Méd., May, 1930, xxvii, 28.*—(*B. T. M.*)

Tuberculous Pleurisy.—Tuberculous pleurisy in general arises from a subpleural tubercle deposit, and the inflammatory condition is a result of allergy. Following a pleurisy with effusion the original lung focus may, by roentgen study, seem to have disappeared. The referred pains of diaphrag-

matic pleurisy are apt to lead to diagnostic errors. A simple test is to have the patient lie on the affected side. In such a position the diaphragm at first makes an increased excursion, intensifying the pain. In general, the symptoms of tuberculous pleurisy may simulate those of pulmonary tuberculosis: namely, a dry unproductive cough, malaise, fever, accelerated pulse, and digestive disturbance, the latter most marked with left-sided pleurisy. Rest, by means of strapping and posture, and heat, by means of an electric pad, are the best symptomatic methods of treatment. Patients should be given a long period of general rest, just as a patient with pulmonary tuberculosis, and the regimen should be continued for many months after all constitutional signs have ceased. It may happen at times that a definite parenchymatous tuberculous lung lesion was present at the onset of the pleurisy, which became absorbed during the illness. One must not be too easily led into optimism regarding the future. Many of the most malignant cases of pulmonary tuberculosis are in patients who give a history of pleurisy with effusion some years previous to their coming for treatment of pulmonary disease. Pleural effusion will usually be absorbed and paracentesis is not always necessary. In some cases, when advisable, the presence of the effusion may allow artificial pneumothorax to be undertaken. The effusion may at times become purulent. If not secondarily infected, repeated aspiration usually results in cure. From one to three years of a carefully regulated life is necessary in order to safeguard such patients against future pulmonary disease. A study that would seem worth while in pulmonary tuberculosis would be to ascertain the end-results in a large number of patients who have at some time suffered from tuberculous pleurisy with effusion.—*Tuberculous Pleurisy, G. B. Webb, J. Am. M. Ass., July 5, 1930, xcv,* 28.—*(G. L. L.)*

Parapneumothoracic Pleurisy.—Bard believes that the majority of pleuritic complications arising during pneumothorax therapy are due to repeated small perforations of the pulmonary parenchyma with the needle. These small wounds heal rapidly, either because of the retractility of the lung or the pneumothorax pressure. If the pleurisy occurred during the first few days of pneumothorax therapy when the lung is more vulnerable, then Bard's view would be tenable. But the fact remains that most of the pleurisies come on during the second or third month of treatment, when puncture of the lung is rarely observed. Pleurisy arises with equal facility on the right and left side and indifferently as to sex. It has been observed most commonly in pneumothoraces which are incomplete due to the presence of adhesions. When the pulmonary lesion is acute and rapidly progressive, pleurisy follows more quickly and more intensely. In some cases, after a first or second refill, a small amount of fluid is seen in the costophrenic angle, but as a rule this is readily absorbed and should not be classed as a true complication. During the second year of artificial pneumothorax, pleural effusions rarely occur. Sudden trauma to the chest-wall is sometimes mentioned as an exciting cause of this complication. Intercurrent diseases, such as influenza, may be followed by the development of fluid in the pneumothorax cavity. The author is of the opinion that many of the effusions are due to a direct spread of the tuberculous infection (probably lying dormant) from the lung to the pleura by tearing or stretching of pleural adhesions. This view is especially favored because most of the effusions have been found to be definitely tuberculous. Many of the idiopathic effusions are allergic in nature and can be best avoided by prolonging the intervals between refills so that a gradual compression is obtained. In this way antigenic dosage is under more or less control just as the dosage of tuberculin is graduated. Pleuritic effusions incident to artificial pneumothorax have been variously classified. Ranke has divided them into three practicable classes. The first group comprises the mild serofibrinous effusions with little tendency to increase in amount and of very short duration. In the second group he has placed the serous effusions with marked lymphocytic reaction. These increase rapidly in amount, are of long duration and gradually become purulent. This type shows the presence of numerous tubercle bacilli. The onset is usually very stormy. The definitely septic and outspokenly purulent effusions belong to the third group. These are characterized by a prolonged febrile course and show the presence of much mixed infection. To this classification the author adds two others: the idiopathic, eosinophilic or allergic type and the dry, adhesion-producing type. Although most of the pleural complications are readily borne by the patient after the first febrile reaction, their occurrence is nevertheless undesirable. When death occurs in these cases, it is usually due to a progressive evolution of the underlying pulmonary lesion, rather than to the effusion itself. During the acute stage of the effusion it is wise to stop refills and not to withdraw fluid excepting in cases of urgent mechanical difficulty. If it should become necessary

to remove fluid, it is best to remove a little air instead. During the chronic stage of the effusion, if it is serous, pneumothorax refills should be given only at long intervals. When the fluid reaches too high a level so that control of the endopleural pressure is lost, it is then best to withdraw fluid and replace it with a like quantity of air. In purulent effusions, repeated washing of the pleural cavity, after removal of the pus, has given fairly good results. In such cases one may prudently avoid using the same location for needle puncture in order to avoid track infections. The rebellious effusions with mixed infection, refractory to all ordinary methods of treatment, present a group for which little can be done therapeutically. Some brilliant results have been reported by the use of thoracotomy, phrenicotomy, and thoracoplasty, but the majority of cases tax the phthisiologist's therapeutic armamentarium, and the prognosis is bad.—*Le pleuriti parapneumotoraciche con particolare riguardo alla patogenesi ed alla cura, A. Lira, Tubercolosi, xxi, August, 1929, 319.*—(*U. E. Z.*)

Idiopathic Pleurisy.—The majority of exudative pleurisies are of tuberculous origin. At postmortem 98 per cent of the cases that have had a primary pleurisy were found to be tuberculous. It is not always simple to determine the tuberculous aetiology in idiopathic pleurisy. Cultures of the exudate are usually negative and cytodiagnosis is important, but animal inoculation is most valuable. The pleura is usually diseased by continuity from foci close to the pleura, from the ribs, from the vertebrae, or by the lymph or blood-stream. The author reports on a material of 250 cases with exudative pleurisy, and of these 80 were considered of tuberculous origin, while there remained 45 in which no clinical or roentgenological evidence of a manifest tuberculosis was found. The majority of cases of tuberculous exudative pleurisy have a favorable prognosis, which the author believes to be due to the bactericidal and immunizing action of the exudate. —*Die sogenannte idiopathische Pleuritis exsudativa tuberculosa, M. Häutemann, Zeitschr. f. Tuberk., 1929, lii, 483.*—(*H. J. C.*)

Mediastinal Pleural Effusion.—Mediastinal pleural effusion is not so infrequent as formerly believed and is often overlooked clinically due to difficulty in diagnosis. It is generally encapsulated, but may rarely occur as a free pleural effusion and extend secondarily into the lateral pleural cavity. The purulent type generally follows pneumonia and should be sought for when return to normal does not occur after the usual period of illness. The characteristic roentgen finding is a triangular shadow on either side of and continuous with the median shadow and from which it cannot be separated regardless of the position in which the patient is placed. It may displace the adjacent part of the lung or heart, usually the latter, to the opposite side. No cardiac pulsation is visible in this abnormal shadow. In some cases typical symptoms are produced, due to pressure on structures in the mediastinum. Early removal is indicated in the empyema due to proximity to important mediastinal viscera. In 15 cases the posterior type predominated and recovery occurred in all but one case. Six were empyemata.—*Mediastinal Pleural Effusion, J. Sagel and L. G. Rigler, Am. J. Roentgenol. & Rad. Ther., September, 1930, xxiv, 225.*—(*W. I. W.*)

Aetiology of Serous Effusions.—A review of a series of cases under artificial-pneumothorax treatment revealed that the outstanding feature in those cases where fluid developed was the presence of adhesions. These adhesions were generally in the upper part of the lung. These "adhesions are disease-bearing surfaces, which undisturbed perform nature's work of limiting the disease." Once they are stretched, there is always the danger of hydrothorax. The stretching results from too large a volume of gas being given with too long intervals.—*The Aetiology of Serous Effusion in Artificial Pneumothorax, W. Stobie, Tubercle, March, 1930, xi, 253.*—(*W. I. W.*)

Treatment of Pleural Effusions. The indications for removal of pleural effusions in cases that are under artificial pneumothorax treatment may be summarized as follows: (1) effusions that appear to be producing fever; (2) effusions that persist for many weeks and it is feared that the pleura will become so greatly thickened that the lung will never reëxpand; and (3) the beginning of obliterative pleuritis. Good results have been obtained by oleothorax in controlling obliterative pleurisy.—*The Treatment of Pleural Effusion in Artificial Pneumothorax, F. G. Chandler, Tubercle, March, 1930, xi, 255.*—(*W. I. W.*)

Apparatus for Aspiration of Pleural Fluid.—A simple, inexpensive, and noiseless apparatus with electric motor or water pump is described. The advantages are that it maintains an even, continuous suction of a known degree and requires little manipulation.—*A Simple Form of Aspirator, F. Heaf, Tubercle, July, 1930, xi, 445.*—(*M. E. P.*)

Treatment of Tuberculous Pleural Exudates.—With the more widespread use of therapeutic pneumothorax this subject has been brought more to the attention of phthisiologists and opportunity has been given to judge better the reactions of the pleural serosa to injections of gas or various liquids. The complications of collapse therapy have opened a new chapter of pleural pathology. Especially since the presentation to the *Société médicâle des hôpitaux* by Renaud, Petit-Maire and Miquet of purulent tuberculous pleurisies treated by systematic and early pleurotomy have there been numerous communications on this subject. Experience over a period of years has led Pissavy, Sergent and Turpin to quite different conclusions. In general, they state, pleurotomy is an exceptional therapeutic measure; puncture the one of choice. If a pleurotomy is to be considered, a later thoracoplasty will almost inevitably be necessary, and even that may fail to obliterate the fistula. Only urgent cases, such as are complicated by secondary infection, should be subjected to such pro e-dure. On the other hand, patience and prolonged care with attention to detail will result in the drying up of many of these pleural suppurations. Evacuation followed generally by injection of oil of gomenol in percentage varying with the sensitiveness of the case will cause the temperature to revert to normal, the cardiovascular troubles to yield, the dyspnoea to cease, the weight to increase. Physical examination and roentgenographic study will show progressive local amelioration. Bronchopleural fistulae will close and changes occur which must be the result of a pachypleuritis, while the suppuration diminishes and finally ceases. Fibrinous masses accumulate in the pleurodiaphragmatic cul-de-sac whi h lay the basis for ultimate symphysis. The danger of parietal abscess following puncture may in a measure be avoided by the use of fine needles, and the introduction into the lumen of a heated stilet before its withdrawal. The frequency of puncture should be based on not only the general and physical signs, but also the menace of cavities, especially when oleothorax is substituted. Local treatment, in spite of the often extraordinary results obtainable by minute and careful application, should not cause general treatment to be neglected. The patient remains a tuberculous individual exposed to reactivation of an infection against which he is not immunized. Especially is reactivation in the opposite lung to be feared.—*Le traitement des épanchements tuberculeux purulents de la plèvre, E. Sergent and R. Turpin, Section d'études scientifiques de l'Oeuvre de la Tuberculose, March 9, 1929, reported in Rev. d. l. Tuberc., June, 1929, x, 383.*—(*A. P.*)

Discontinuous Pleural Drainage in Pyopneumothorax.—Whether this condition occurs spontaneously, or complicates therapeutic pneumothorax, it is a formidable affection, desperately persistent, evolving usually towards death by interminable suppuration and progressive cachexia. The usually employed therapeutic measures have little effect: lavage of the pleura gives only transitory relief and the density of the pus ordinarily necessitates the employment of large trocars and repeated interventions which tend to lead to parietal suppuration. A large pleurisy rarely becomes sterilized. Likewise with oleothorax, these methods have given little success in pleural infections of even moderate virulence. In grave infections of a large pleural cavity, the pus reforms very rapidly. Punctures, even if followed by lavage and injections of gomenolated oil, have to be frequently repeated, sometimes every five or six days. When there exists also a pleuropulmonary fistula, the patient's condition becomes absolutely intolerable. Thoracoplasty has been proposed, and it is indeed a curative measure but it is only necessary to see some of these patients to realize that for many it is out of the question. It is also classically admitted that pleurotomy with drainage yields poor results in purulent tuberculous cases. One reason seems to be that the continual movement of air and septic products back and forth from the soiled dressing to the pleural cavity is a source of danger. Drainage ought to be, so far as possible, simply evacuation. *Method Employed:* Under local anaesthesia, with the patient sitting, a cutaneous incision of 3 cm. in length is made, in the lowest possible intercostal space, as determined by exploratory puncture. The muscles are separated by a Kocher forceps and then another is inserted, holding a drain of about the calibre of a no. 20 Nelaton sound, which is pushed into the pleura and left in place. Such a drain functions without reflux of air and can be shut off by a small clamp. Morning and evening this is opened and the drainage soon becomes fixed at 30 to 60 cc. per twenty-four hours. A no. 20 Nelaton sound may be substituted, which is easier to introduce. The free end is protected by a gauze tampon, attached to a binder. In infected pleurisies lavage with 1 per cent iodine is very effective, introduced with a 20-cc. syringe in amounts of 100 to 150 cc. *Results:* It is not claimed that this method of drainage cures all, but it does cure most of the accidents of pleural suppuration and

make a secondary thoracoplasty possible. The septic phenomena rapidly disappear, while the discharge markedly diminishes. Spontaneous retraction of the hemithorax occurs, aiding in maintaining lung compression. When their condition is sufficiently improved, in quite unilateral cases, thoracoplasty may be performed. The parietal pachypleuritis which develops retards the postoperative retraction, however. Two illustrative cases are cited, with roentgenographs and diagrams, and two others more briefly, the last of whom was *in extremis* and succumbed almost immediately.—*Le drainage discontinu de la plèvre dans le pyopneumothorax, P. Santy and L. Philip, Rev. d. l. Tuberc., June, 1929, x, 361.*—(*A. P.*)

Treatment of Tuberculous Empyema.—The multiplicity of therapeutic measures proposed for these has troubled no little the opinion of physicians. Their frequency gives their treatment great importance. First comes the question of surgical treatment. Thoracotomy for tuberculous empyema is generally rejected by most phthisiologists as harmful. Renaud's recent communication to the *Société médicale des hôpitaux* was immediately assailed, notably by Rist. Two cases are cited showing how disastrous may be its results. The sole instance in which it seems justifiable is that of secondary pyogenic infection; this, grafted on a tuberculous one, may force our hand. In such case a later thoracoplasty may be necessary to obliterate the suppurating cavity. Such cases are exceptional. Further, it should be remembered that every case of tuberculous exudate, if it lasts long enough, becomes purulent. Three classes of cases are considered: *1: Primary Tuberculous Pleurisies:* Four cases are cited, 3 of which received only periodic thoracentesis followed by intrapleural injection of air, the fourth progressively increasing injections of 3 per cent gomenolated paraffin oil, all being eventually cured. *2: Purulent Pleurisy Following Spontaneous Pneumothorax:* One case is cited, complicated by a parietal abscess, also cured following repeated evacuation and injection of gomenolated paraffin. *3: Purulent Pleurisy Following Artificial Pneumothorax:* Three observations are cited, with good results from oleothorax (gomenolated paraffin). *Discussion:* It is concluded that when dealing with simply a chronic tuberculous pleurisy, the most simple therapy, consisting of repeated aspirations followed by air insufflation, should first be followed and in most cases will suffice. When it does not, an oleothorax is the next logical step, using between 2 and 6 per cent of gomenol in the oil. Ultraviolet radiation seems to have little effect on the pleurisy but is valuable in the healing of parietal fistulae. To prevent these latter (1) the gas should be injected through the same trocar used for fluid withdrawal; (2) the stilet should be replaced before removing the trocar; and (3) the patient should lie for several minutes on the healthy side after puncture. It is a stupid surgical mistake to open tuberculous purulent pleurisies without secondary injection; a permanent fistula will remain which may be a menace.—*Le traitement des pleurésies purulentes tuberculeuses, L. Bernard and F. Triboulet, Section d'études scientifiques de l'Oeuvre de la Tuberculose, March 9, 1929, reported in Rev. d. l. Tuberc., June, 1929, x, 386.*—(*A. P.*)

Prognosis in Pleural Effusions.—A study was made in 126 cases of idiopathic pleurisy for the purpose of ascertaining the factors that influence prognosis. The disease was found to occur more frequently in the second and third decades, although the incidence of death was not out of proportion to that in other decades. Of these 126 cases, 35 are dead; 29 are known to have died of pleurisy, tuberculosis, or some process that could be traced directly to the pleurisy. Eighteen died within the first year after onset, five within the second year, and four within the third year. The cause of death of the remainder is unknown. Patients cured or completely recovered numbered 73, or 58 per cent. Guinea pigs were inoculated with the pleural fluid from 92 patients. In 22 cases necropsy revealed positive evidence of tuberculosis; 13 were failures because of the premature death of the guinea pigs. Nine of the 22 patients from whom a positive result was secured are dead, and 6 have tuberculosis elsewhere in the body. In comparison, of patients whose pleural fluid reacted negatively in guinea pigs, a total of 56.1 per cent recovered, whereas there was recovery in only 36.3 per cent of those whose fluid reacted positively. Eleven of the 17 patients who died after the first year had only two months of rest, including the active illness, before they returned to their normal activities. Ten of these died within the first four years from recurrence of pulmonary tuberculosis. Forty-three of the 68 who recovered had four months' rest or more. It would seem that if a patient survives the first three years, and particularly the first five years after the original pleural effusion, his chances are excellent for complete recovery. The positive result of guinea-pig inoculation carries with it a more grave prognosis. It is clear that idiopathic pleurisy with effusion should be treated as

tuberculosis with a matter of months of rigid regimen, rest, and the methods usually applied in the treatment of tuberculosis.—*The Prognosis of Pleurisy with Effusion, F. W. Gaarde, J. Am. M. Ass., July 26, 1930, xcv, 249.*—(*G. L. L.*)

Tuberculous Enteritis with Inanition Oedema.—Inanition oedema, though most frequently associated with the dietary deficiencies of war-time, is found also in cases of malnutrition secondary to disease of the gastrointestinal tract. A case is reported of such a condition due to dietary restriction combined with tuberculous enteritis. Moderate tissue oedema and ascites were present, and a definite history of tuberculous enteritis for nearly three years before death. In this case the capillary pressure was slightly elevated and the colloid osmotic pressure of the serum-proteins was markedly diminished. The oedema was attributed to the disturbed balance between the capillary blood-pressure and the osmotic pressure of the blood proteins. Increase of protein and fat in the diet did not produce elevation of the serum-protein percentage. Blood transfusions, however, were followed by a rapid subsidence of the oedema as a result of the elevation of the colloid osmotic pressure of the blood with resultant restoration of the balance between this and the capillary blood-pressure. The physical factors in the production of oedema bear a distinct relation to the changes in the osmotic pressure of the plasma proteins in inanition and in renal and cardiac disease.—*Inanition Edema Associated with Tuberculous Enteritis: Mechanism of the Production of Edema, E. M. Landis and S. S. Leopold, J. Am. M. Ass., May 3, 1930, xciv, 1378.*—(*G. L. L.*)

Intestinal Tuberculosis.—In a series of 849 patients with intestinal tuberculosis, 93.95 per cent had advanced pulmonary tuberculosis. In this group 82.4 per cent had tuberculous lesions with cavitation, while 77.6 per cent had bilateral lesions. The diagnosis of intestinal tuberculosis was made in 43.3 per cent by clinical and X-ray methods, and in 7.7 per cent by a roentgenological examination only. In 12.6 per cent the diagnosis was made at autopsy. The therapeutic regimen used in the treatment of these patients with intestinal tuberculosis consisted of rest, diet, heliotherapy and calcium chloride. Of the total number of 849 patients with intestinal tuberculosis, approximately 21 per cent were improved and 2 per cent were cured, following hospitalization. The remainder of the patients were unimproved or were in a condition of retrogression; 42.4 per cent of the patients died.—*A Study of Intestinal Tuberculosis Among Ex-Service Men, P. B. Matz, Am. J. Med. Sc., April, 1930, clxxix, 532.*—(*W. I. W.*)

Fatal Haemorrhage from Tuberculosis of Mesenteric Lymph Nodes.—A case of lethal haemorrhage in a 14-year-old girl, with tuberculous spondylitis and compression of the cord and tumor in the left upper abdominal area with a dissecting abscess is recorded. At autopsy there was found an old haematoma with fresh haemorrhage at the root of the mesentery, the source being a progressive, caseous periadenitis.—*Ein Fall von letaler Blutung als Folge einer Tuberkulose der Mesenterialdrüsen, A. J. Rawitzkaja, Beitr. z. Klin. d. Tuberk., 1929, lxxi, 790.*—(*H. J. C.*)

Tuberculosis of Spleen.—Cases of tuberculous splenomegaly, or of isolated tuberculosis of the spleen, are very rare. Lubarsch differentiates four types, as follows: (1) indurative, (2) haemorrhagic, (3) diffuse miliary, and (4) large nodular. The case presented belongs to a fifth, not yet described type, the tumor-like granulating form. The spleen was removed at operation. The patient was 42 years old. About five weeks before admission, he developed pains in the splenic region following heavy lifting. At this time, the spleen was considerably increased, and its lower pole was palpable in the median line. The lymph nodes in the left axilla and in both inguinal regions were swollen. Otherwise the status, including the blood picture, was normal. The patient died four weeks following the operation; an autopsy was not performed. The spleen measured 18 x 9 x 8 cm.; its surface showed many large nodules; the capsule was smooth and thin. On cut-surface, it was seen that most of the splenic tissue was replaced by lymph-node-like tissue. There were several subcapsular anaemic infarcts. The new-formed tissue consisted of many large-celled tubercles with few giant cells and no caseation. This granulation tissue had replaced the normal tissue; the latter which was found near the two poles did not contain any tuberculous foci. One artery in the hilar fat tissue showed tuberculous lesions in its wall. The infarcted areas were most likely part of the specific granulation tissue. Tubercle bacilli were not found in the histological sections. Other bacteriological examinations were not done.—*Ein Beitrag zur tuberkulösen Splenomegalie, G. Leidel, Centrlbl. f. allg. Pathol. u. pathol. Anat., March 20, 1930, xlviii, 54.*—(*M. P.*)

Orthopaedics in Tuberculosis.—Conservatism prolongs treatment and end-results are often unsatisfactory. Stabilization by operation is preferable to the use of walking instruments. The only cure of inflammation in bone is by sclerosis. Long-continued extension and external splinting tend to produce atrophy. Extension, recumbency, and total lack of weight-bearing should be used for the relief of acute symptoms and not as curative measures. *Coxalgia:* The patient in the acute stage is nursed supine, and weight extension is applied to relieve pain and spasm and to reduce deformity. Usually after six to nine months all symptoms and signs of disease except spasm on rotation of the hip are lost, both hips are immobilized in a double spica cast, and walking is begun. This is continued until all spasm is absent for three months, the X-ray shows sclerosis, and the patient can walk and run without apparatus. The incidence of abscess-formation, relapse, and mortality from miliary tuberculosis and meningitis is not increased by this treatment. Localized juxta-epiphyseal disease and extraärticular foci may be completely cured by early operation. Bony ankylosis is desired when there is destruction of bone, and extraärticular arthrodesis by bone grafting can be used in selected cases. Classical deformities are treated by osteotomy followed by prolonged locomotion in a double plaster spica. When the disparity in length is great the sound femur may be shortened. *Tuberculous Spinal Caries:* The prone position is best. Adults can be left prone without apparatus, but children need a brace. The author's model is illustrated. Apart from the treatment of complications, such as compression, operation should be limited to late and selected cases. The massive grafts and fusions of Albee and Hibbs should be used only in adults, and for large angular curves when collapse is complete, or occasionally for protection when collapse is limited to two vertebrae. *Tuberculous Knee:* Good functional results are rare. Mobility is of no advantage unless the joint will bear weight. Stability is usually poor when the bone is involved. Stabilizing operations are preferable to the use of walking apparatus. When there is fixed flexion, capsulotomy is preferable to prolonged extension, and should be followed by a stabilizing operation.—*Orthopaedic Aspects of Surgical Tuberculosis, J. B. Barnett, Brit. J. Tuberc., July, 1930, xxiv, 122.*—(*R. M. F.*)

Vitamines in Treatment of Bone Tuberculosis.—Forty-three patients with tuberculous lesions in bones were given large doses of codliver oil and irradiated ergosterol, having vitamines A and D respectively. Thirty-five patients with similar lesions were given moderate doses of codliver oil only. Approximately the same amount of progress was observed in each group of patients, and it is concluded that the use of preparations containing large amounts of vitamines A and D does not appear to be of more curative value than that of codliver oil.—*Treatment of Bone Tuberculosis by Large Amounts of Vitamines A and D, C. L. Pattison, Brit. M. J., August 2, 1930, no. 3630, 178.*—(*M. E. P.*)

Granulation Tissue of Fistulae in Bone Tuberculosis.—The granulation tissue of bone fistulae contain all the elements of typical tubercles but no avascular caseous tubercles. Three layers can be differentiated: (1) the surface layer of fibrin, degenerated exudate and detritus; (2) exudate poor in cells superficially, but rich in cells in the deep layers; and (3) the fibrous layer. The cell mixtures mostly of lymphoid nature with polynuclear types and "endothelial" types form irregular accumulations, especially around the vessels. Giant cells were rarely absent and were found in the deeper layers of the second depth. The gray turbid appearance of the tissue is due to the lack of vessels. The polymorphism of the tissue accounts for its difference from typical tuberculous tissue.—*Das granulationsgewebe der Fisteln bei Knochentuberkulose, N. A. Gurewitsch, Arch. klin. Chir., 1929, clv, 289.*—(*H. J. C.*)

Treatment of Bone Tuberculosis in Adults.—The campaign against osseous tuberculosis, especially in adults, has been conducted in a singularly less active way than that against pulmonary tuberculosis. Nevertheless, its treatment, both from the individual and social viewpoint, is more encouraging. The probable reasons for the first premise are, first, that bone tuberculosis does not constitute, as does pulmonary, a danger to neighbors and those in the vicinity; second, marine sanatoria cannot be built in many provinces. Furthermore, many physicians consider bone tuberculosis as a cause of permanent incapacity, and hospital and clinic patients are frequently subjected to amputation for this cause. For the treatment of bone tuberculosis in the adult, as in the child, there are two methods: (1) general treatment, based on a heliomarine cure, almost specific; and (2) local treatment, consisting when possible in extirpation of the focus, when impossible in as perfect and prolonged immobilization as possible. In the adult, especially the adult obliged to earn

a living, who suffers from tibiotarsal tuberculosis, there must be no hesitation in doing a resection, which may often be limited to astragalectomy. In the case of the hip and knee, a good ankylosis will always be preferable to a partial mobility which is of little functional value and exposes the inflammatory process to reactivation. In contrast to the excellent results from astragalectomy and resection of the knee, resection of the hip is mutilating and the orthopaedic results disastrous, but methods of extraärticular arthrodesis have been developed analogous to Albee's operation on the vertebral column, methods of rigorous immobilization. Concerning localizations in the upper extremities, these are much scarcer and are less incapacitating. A tuberculosis of the wrist or elbow in an adult should cure in six months, often with mobility. Tuberculosis of the shoulder is more refractory but extraärticular arthrodesis securing immobilization will cause subsidence of the process. In general, the above localizations require hospitalization of six to ten months before resuming work, not to say becoming cured. Cure of bone tuberculosis is a slow process. However, one cannot defend the *laissez-faire* policy so commonly followed, when a combination of heliomarine cure for several months plus surgical intervention of relatively benign nature would return them to activity. Even climatotherapy alone has accomplished much, but it takes years and demands prolonged immobilization. Surgical methods also applied reduce the time and lessen the chance of relapse. A number of excellent bone photographs are reproduced.—*Le traitement de la tuberculose osseuse chez l'adulte, J. Delchef, Rev. Belge d. l. Tuberc., September-October, 1929, xx, 217.*—(*A. P.*)

Key to Abstractors

A. P.: Andrew Peters, Pittsfield, Mass.
B. T. M.: B. T. McMahon, Loomis, New York.
G. L. L.: George L. Leslie, Howell, Mich.
H. J. C.: H. J. Corper, Denver, Col.
H. S. W.: H. S. Willis, Northville, Mich.
J. G.: Jacob Goldberg, Loomis, New York.
J. S. W.: J. Stanley Woolley, Loomis, New York.
M. E. P.: M. E. Parker, Kalamazoo, Mich.
M. P.: Max Pinner, Tucson, Arizona.
R. M. F.: R. M. Franklin, Loomis, New York.
U. E. Z.: U. E. Zambarano, Providence, R. I.
W. I. W.: Walter I. Werner, Pontiac, Mich.